OPR: SSD/ITB   August 15, 2011

Administrative
Standard Operating Procedure
200-01-002

Computer Repair

1. References.

2. Supersedes.

    This SOP supersedes Standard Operating Procedure: Computer Repair dated October 22, 2010.

3. General.

    Information Technology (IT) hardware and software must be maintained, upgraded, and on occasion, repaired when broken. The Computer Repair function fills this requirement.

4. Purpose.

    This document defines the standard operating procedures for Computer Repair personnel working for the National Climatic Data Center (NCDC). Specifically, the document presents the process flow, steps, tools and techniques, quality control procedures, and resources required to perform Computer Repair operations within the Acceptance Quality Levels (AQLs) for the contract.

5. Scope.

    Computer Repair personnel work as part of the NCDC Information Technology Branch (ITB) and service NCDC's information technology infrastructure. This includes, but is not limited to, the maintenance of desktop computers, notebook computers, workstations, file servers, local area network (LAN) components, RAID arrays, and printers.

6. Responsibility.

    6.1. Director (Authorizing Official / AO)

    The Director, or designated representative, approves and ensures compliance with all Center-wide SOPs.

    6.2. System Owner (SO)

    The System Owner, or designated representative, ensures compliance with this SOP.

    6.3. Information System Security Officer (ISSO)

The ISSO performs routine audits on the system to ensure compliance with these procedures and reports compliance to the System Owner and NESDIS OCIO.

7. Procedure.

7.1. Overview

This section is an overview of Computer Repair operations and management. Subsequent sections describe the process flows, steps, tools and techniques, quality control, and resources required to complete Computer Repair operations.

7.1.1. Process Tasks

The following list defines the basic process tasks for Computer Repair operations:

1. Install new computer equipment and move existing equipment;
2. Maintain computer equipment;
3. Stock spare computer parts;
4. Maintain computer equipment database;
5. Add, move, inventory, or change LAN drops;
6. Maintain tape drives, video conference system, and InFocus system; and
7. Generate monthly reports from NCDC Help Desk system trouble tickets.

7.1.2. Process Management

Computer Repair management consists of the following areas:

1. Personnel management (section 7.3.1) – The Network User Support Team provides oversight to the PC Technician(s);
2. Monthly Reporting – Computer Repair work is recorded in a monthly report that is placed on the NCDC website and accessible to all NCDC personnel, including the Contracting Officer's Technical Representative (COTR);
3. Supply inventory - Maintain an adequate stock of supplies (Section 7.3.2);
4. Equipment management (section 7.3.3) – PC Technicians provide on-call maintenance services and arrange for all warranty, third party, and Original Equipment Manufacturer (OEM) maintenance as applicable. No subcontractors are involved in this service area; and
5. Quality control management (section 7.5) – Quality control consists of three elements:
    a. Quality planning
    b. Scheduled and unscheduled inspections and reviews
    c. Quality assessment and reporting
    Computer Repair personnel conduct quality management in these areas to ensure compliance with AQL requirements for the contract.

7.2. Process Flow

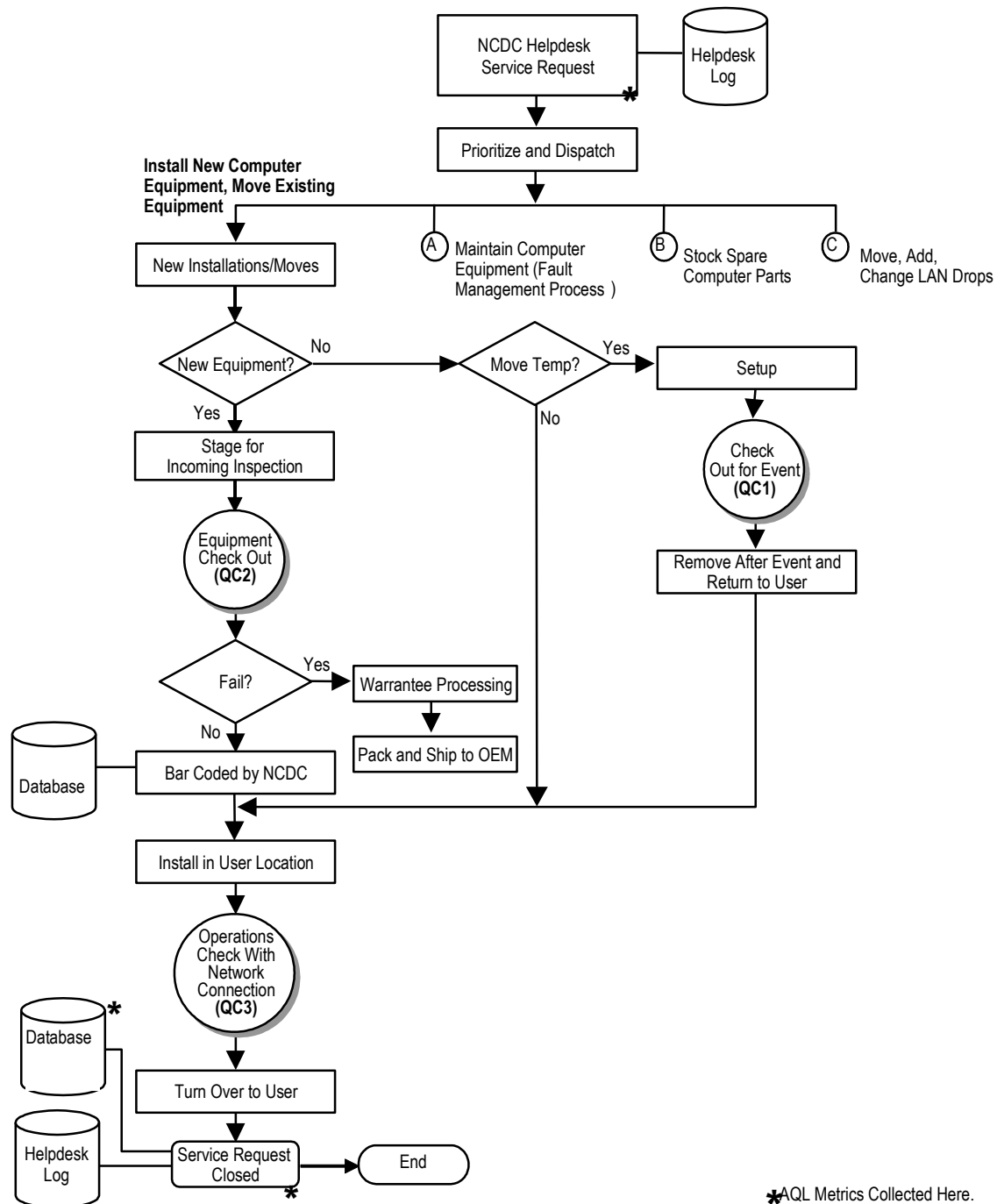Refer to the following flowcharts when completing the tasks outlined in section 7.4.

Figure 1. Process Flow for Installing and Relocating Computer Equipment
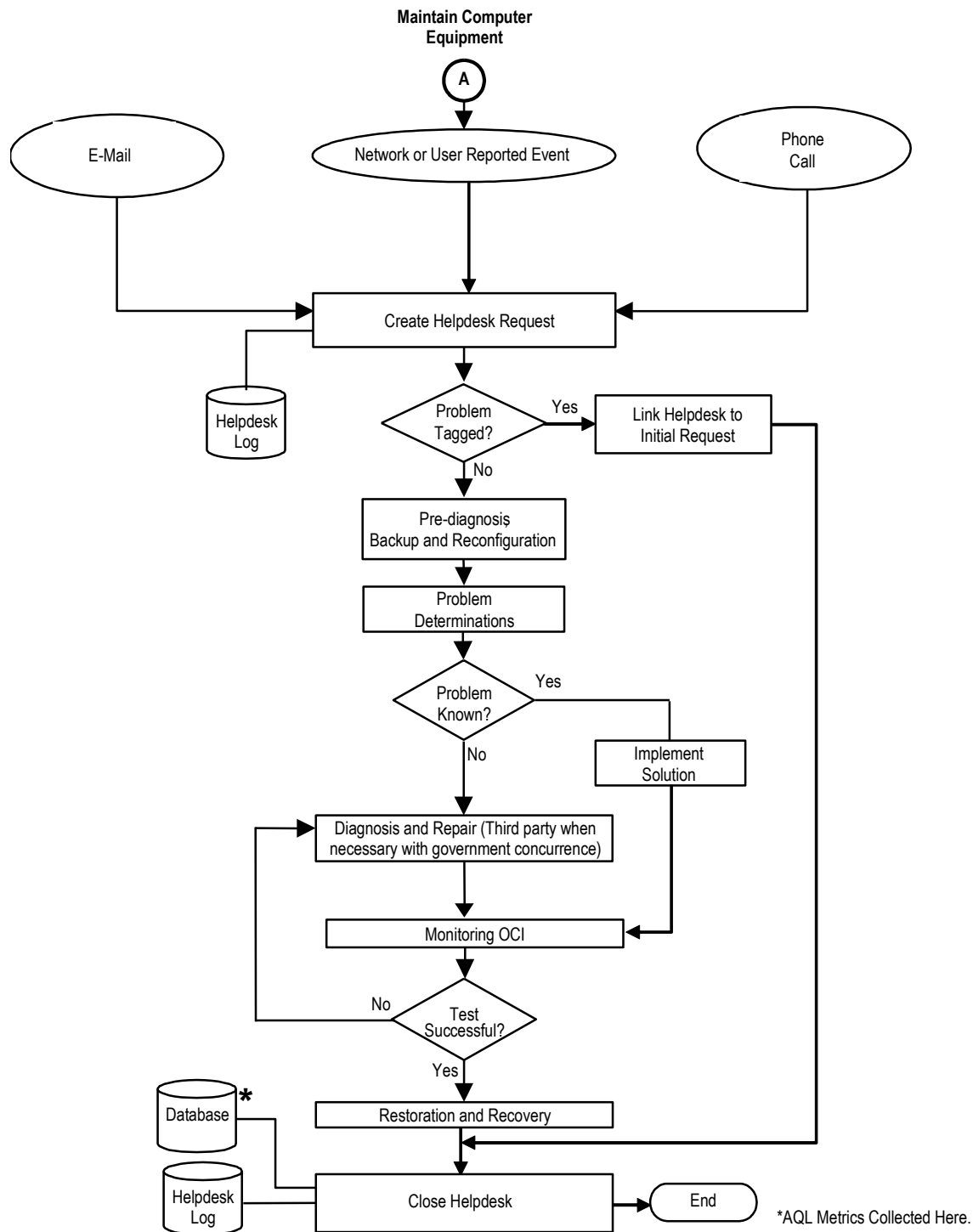
**Maintain Computer
Equipment**

A

E-Mail

Network or User Reported Event

Phone
Call

Create Helpdesk Request

Helpdesk
Log

Problem
Tagged? — Yes → Link Helpdesk to
Initial Request

No

Pre-diagnosis
Backup and Reconfiguration

Problem
Determinations

Problem
Known? — Yes

No

Implement
Solution

Diagnosis and Repair (Third party when
necessary with government concurrence)

Monitoring OCI

No — Test
Successful?

Yes

*
Database

Restoration and Recovery

Helpdesk
Log

Close Helpdesk — End

*AQL Metrics Collected Here.

Figure 2. Process Flow for Maintaining Computer Repair
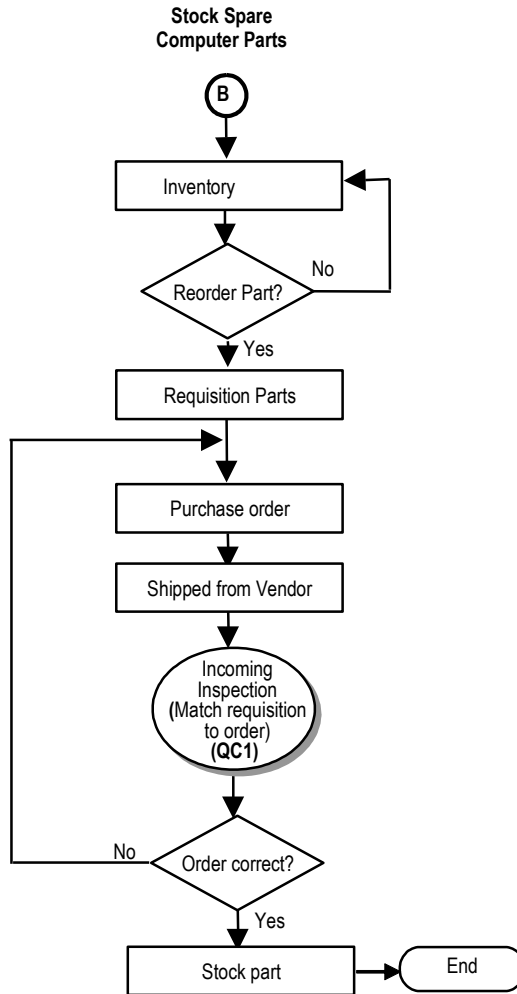
Figure 3. Process Flow for Stocking Spare Computer Parts

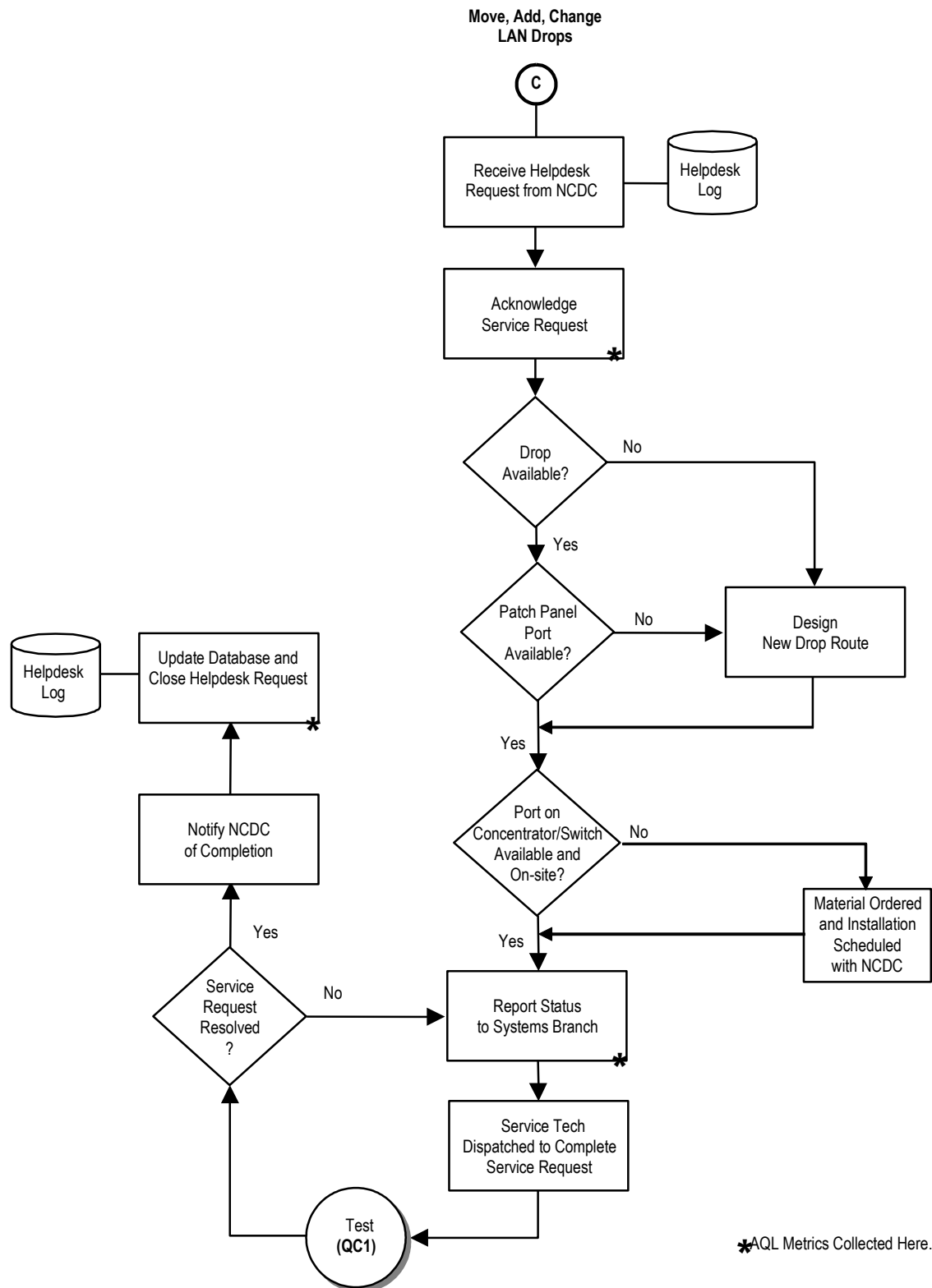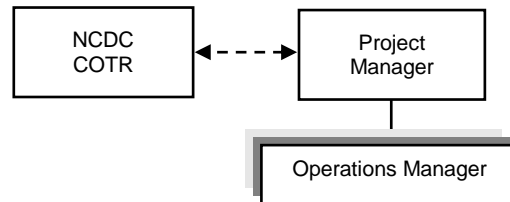**Move, Add, Change
LAN Drops**

Figure 4. Process Flow for Moving, Adding, and Changing LAN Drops

7.3. Process Management

7.3.1. Personnel Management

Computer Repair organization chart:

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┌──────────┐          ┌──────────┐
│   NCDC   │◄ ─ ─ ─ ►│ Project  │
│   COTR   │          │ Manager  │
└──────────┘          └──────────┘
                            │
                   ┌─────────────────────┐
                   │ Operations Manager  │
                   └─────────────────────┘
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7.3.2. Supply Management

Printer toner cartridges and ink cartridges are critical supply items for the Computer Repair service area. The PC Technician performs weekly inventories of supplies to maintain 60 days of supplies on hand. If the Technician discovers items at their reorder point, the technician notifies NCDC's IT Branch Chief, or designate, so the supplies can be ordered.

7.3.3. Equipment Maintenance Management

The following list describes the Government classification of critical computer systems:

1. Those for which the contractor is solely responsible – PC Technicians provide a combination of in-house and third party maintenance;
2. Those for which government third-party maintenance contracts are in place – PC Technicians provide initial diagnosis and limited repair; and
3. Those for which OEM maintenance agreements are in place – PC Technicians perform initial diagnosis and contact vendor for repairs.

Upon receipt of an NCDC Helpdesk notification of a system or equipment malfunction, a PC Technician responds to the call and performs an initial problem diagnosis. If a third-party maintenance agreement covers the equipment or system, the Technician will attempt limited repair. If this is not successful, the Technician contacts the third-party maintenance provider and schedules repair service. If an OEM agreement covers the equipment or system, the Technician contacts the OEM and schedules repair service.

If maintenance of the equipment or system is the sole responsibility of the contractor, the Technician first attempts to repair the equipment at the user's location. If this is unsuccessful, the Technician moves the equipment to the Computer Repair Shop for further analysis and repair. The Shop has benches, repair parts, and general-purpose test equipment for troubleshooting and diagnosing equipment anomalies or failures. PC

Technicians diagnose the problem, repair the equipment, test the equipment, return it to the user, and close the trouble ticket.

Computer Repair personnel also perform preventive maintenance (e.g., vacuuming printers, servers, etc.) according to vendor specifications and system use.

7.4. Processes

Computer Repair has developed special processes for the following operations:

1. Installation and relocation of computer equipment;
2. Maintenance of computer equipment;
3. Stocking of spare computer parts;
4. Maintenance of the computer equipment database;
5. Installation, movement, and repair of LAN cabling; and
6. Maintenance of video conference system and InFocus system.

7.4.1. Installation and Relocation of Computer Equipment

Computer Repair personnel support the receiving, inspection, staging, configuration, operations check, warranty processing, and installation of new PC desktops. The contractor receives components from vendors at a staging area. Upon arrival of equipment, the Mailroom enters a Helpdesk in the Hardware Checkout category using the Helpdesk System. This is done within two hours of the equipment's arrival. PC Technicians pick up the equipment, inspect the components for shipping damage, and perform an inventory to verify types and quantities of equipment and components. If equipment is not picked up by PC Technicians within two days its arrival, the Operations Manager will be notified by the Administrative Services manager who oversees mail room operations.

Prior to implementing additions and moves of PC or workstation desktops, the PC Technician determines if there is a network drop available. Disposition of older PC desktop equipment is handled under NCDC's disposition policies.

The following sections describe installation and relocation activities.

7.4.1.1.   Receiving and Inspection

The PC Technicians compare the shipping document with the receiving inventory to verify the receipt of the correct items and quantities. Technicians annotate copies of the incoming shipping documents to acknowledge receipt and report all discrepancies to the appropriate NCDC personnel for resolution prior to acceptance of any new equipment.

The PC Technicians also inspect each item for damages. Upon acceptance, the PC Technician performs an operations check by applying power to new components to identify initial component failures.

7.4.1.2.   Bar code and Re-Package

After a successful operations check, the PC Technician contacts NCDC's Property Custodian to request that the placement of barcode labels on the components. Next, the Technician temporarily warehouses the components until its installation at the NCDC location. If the component is a PC or workstation, NCDC loads all necessary applications software on the PC or workstation before the item is warehoused.

7.4.1.3.   Staging Process Tools

Staging tools include component operations manuals, test driver subsystems, and test equipment. Required test equipment is available in the Computer Repair Shop and usually includes a multi-meter and surge suppressor.

7.4.1.4.   Installation and Integration

Installation activities include installing drop cables, PC and workstation desktops and peripherals, and all hardware and software networking components. Integration activities consist of configuring hardware and software components to inter-operate as a system with NCDC equipment. Installation of a new video card and drivers is an example of an integration activity.

Desktop installation and integration consists of installation of hardware, configuration, and verification of interoperability with the customer's other equipment. The PC Technician adheres to all installation specifications and procedures identified in the vendor manuals.

Following installation, the PC Technicians perform individual component and system installation checkout to verify that the equipment components are operating according to their specifications and inter-operating with NCDC equipment.

7.4.1.5.   Installation Process Tools

Installation process tools include the following items:

1. Site Installation Package or Service Implementation Package;
2. Bill of materials;
3. Site preparation documents;
4. Vendor manuals;
5. Installation tools;
6. Test equipment; and
7. Mechanical tools.

7.4.2. Maintenance of Computer Equipment

7.4.2.1.   Problem Determination and Isolation

Problem determination requires a trip to the user's desktop to troubleshoot and diagnose the problem and involves discussions with the user to determine the context and circumstances in which the fault occurred.

7.4.2.2.   Backup Repair and Recovery

To maintain operational capability, it may be necessary to resort to a backup or hot-standby device or to temporarily reconfigure the desktop to restore service.   All backup activities depend on the severity of the problem.

7.4.3. Stocking of Spare Computer Parts

The PC Technicians maintain a small supply of spare parts for computer maintenance and repair. This supply is located in a secured storage area of the Computer Repair Shop.

7.4.4. Maintenance of the Computer Equipment Database

The desktop management and configuration management systems track computer hardware. The PC Technicians complete the following steps to record receipt of new computer hardware in the Computer Equipment Database:

1. Receive new computer equipment;
2. Acquire a bar code label from NCDC and attach the label to the new equipment;
3. Add the equipment to the appropriate Hardware database or spreadsheet;
4. If necessary, temporarily warehouse the equipment until ready to be installed; and
5. Otherwise, deliver to IT Branch for software installation.

7.4.5. Installation, Movement, and Repair of LAN Cabling

Engineering Review: The NCDC IT Branch reviews all service requests and service orders for completeness prior to initiating add, move, or change activities. If there is insufficient hub concentrator/switch port availability or if no drop is available, the IT Branch arranges for concentrator port expansion and engineers a new drop route.

Implementation: PC Technicians implement the addition, move, or change tasks and report completion to the IT Branch who performs a final quality check. If required, PC Technicians install RJ45 connectors to new cables.

7.4.6. Maintenance Video Conference System

PC Technicians provide setup and maintenance of InFocus equipment. If a repair is needed, the Technician will use the manuals provided by Infocus to attempt a repair. If the repair requires further technical documentation, the technician can use the Infocus knowledge base. Telephone support is available from 6 AM to 6 PM at 1-800-799-9911.

7.5. Quality Control Steps

7.5.1. Quality Planning

Quality planning consists of three steps:

7.5.1.1.   Develop quality standards

Task objectives and their associated quality control tasks and metrics. Computer Repair personnel should refer to these standards when performing Computer Repair tasks.

COMPUTER REPAIR AQLS

Performance Standard for Tasks	AQL	Quality Control Tasks & Metrics Collection
Initiate appropriate corrective action within 30 minutes and complete repair within 24 clock hours for **critical** Computer Repair	0	Figure 2 is the process of repair and test. Timeliness records are maintained in the database
Initiate appropriate corrective action within one work day and complete repair within three working days after problem report for **non-critical** Computer Repair	0	Figure 2 is the process of repair and test. Timeliness records are maintained in the database

7.5.1.2.   Develop effective standard operating procedures to meet quality standards

Computer Repair personnel and other contractor staff update standard operating procedures as approved changes in process, time schedules, or procedures occur. Computer Repair personnel activities which relate to changes to the standard operating procedures include:

1. A monthly activity report is produced from the NCDC Help Desk system trouble tickets serviced by the PC Technicians.
2. The Program Manager and Operations Manager continually monitor the priority, response time, and status data of trouble tickets via Helpdesk software and communicate with the PC Technicians concerning recommended improvements if required.
3. The PC Technicians meet each morning to discuss performance, quality and response times, and regularly coordinate workloads. The Operations Manager meets weekly with the Program Manager and Computer Operations Support supervisor.
4. If the PC Technicians identify a potential procedural change, they recommend the change to the Operations Manager or Program Manager. If the Program Manager approves the change, she/he will forward the change to the NCDC COTR for review and evaluation.
5. Upon receipt of NCDC approval, the Program Manager, Operations Manager, and PC Technicians will revise operating procedures.

7.5.1.3.   Define and assign quality control responsibilities

QUALITY CONTROL RESPONSIBILITIES FOR COMPUTER REPAIR

Personnel	Responsibilities
Staff Members	• Follow operating procedures in task performance • Seek guidance of supervisor when questions occur • Verify the accuracy of their own performance as part of the task performance

7.5.2. Assessment and Reporting

Computer Repair personnel use the reporting capability of the NCDC Help Desk System to record and assess AQL performance. Computer Repair Personnel will document any problem that occurs during the contract and bring it to the immediate attention of the Program Manager and appropriate NCDC personnel for quick resolution.

When a serious error occurs or a technician fails to meet an Acceptable Quality Level (AQL), the Program Manager and the Operations Manager will meet the day of the occurrence. The Program Manager will also notify the COTR. The contractor will identify and initiate corrective action within 24 hours.

When two serious errors have occurred or technicians have failed to meet two AQLs, the contractor Program Manager will additionally meet with the Operations Manager on a weekly basis until NCDC has confidence that corrective measures are adequately in place to meet required AQL levels.